SCIENCE IN THE ARGENTINE REPUBLIC

The Argentine Republic. Written in German by Richard Napp, assisted by several Fellow-writers, for the Central Argentine Commission on the Centenary Exhibition at Philadelphia. With several maps. (Buenos Ayres, 1876.)

Physikalische Beschreibung der argentinischen Republik, nach eigenen und den vorhandenen fremden Beobachtungen entworfen. Von Dr. Hermann Burmeister. Erster Band: die Geschichte der Entdeckung und die geographische Skizze des Landes enthaltend. (Buenos Aires, 1875.)

Acta de la Academia Nacional de Ciencias Exactas existente en la Universidad de Córdova. Tomo I. (Buenos Aires, 1875.)

Los Caballos Fósiles de la Pampa Argentina. Descriptos por Dr. Hermann Burmeister, Director del Museo Público de Buenos Aires. Obra ejecutada por órden del Superior Gobierno de la Provincia de Buenos Aires, para ser presentada en la Exposicion de Filadelfia. Con viii. Láminas Litografiadas. (Buenos Aires, 1875.)

ON several previous occasions[1] we have alluded to the excellent work in science accomplished by Prof. Burmeister, or under his supervision, since that eminent German naturalist took up his residence in the Argentine Republic. A batch of books, which has now, we regret to say, been lying before us for some time, testifies to his unabated activity in the good cause, and requires a few words of acknowledgment and explanation. The first of these, originally written in German by Richard Napp, but translated for the benefit of the Anglo-Americans, gives a general physical and commercial account of the Argentine Republic, prepared on the occasion of the Centenary Exhibition at Philadelphia. It is, of course, rather superficial, as is usually the case with such essays, but contains a good deal of information, and will be useful to the many Anglo-Saxons who are now settling in various parts of the country of which it treats.

Next we have the first volume of a complete physical description of the Argentine Republic, by Dr. Burmeister himself, which when finished will, as we understand from the introduction, contain a much more complete account of this extensive territory and its products than any work that has yet appeared. The present portion of it gives us the history of the discovery of the country and an account of its physical geography. Subsequent volumes will contain a general *résumé* of its natural history and geology. A French edition as well as a German will be issued, and a folio atlas will contain the necessary illustrations.

The third work on our list is the first volume of the "Acta" of the National Academy of Sciences of Cordova, which, as we have explained to our readers on former occasions, has been recently re-constituted under Dr. Burmeister's directorship. It contains contributions to science by some of the members of the new professoriate, the organisation of which has caused our excellent friend so much embarrassment. Dr. Stelzner and Dr. Brachebusch treat of various points in the geology and mineralogy of the Argentine Republic. Dr. D. C. Berg contributes an essay on the Lepidoptera of Patagonia, based upon collections made during an excursion to that country in 1874.

Lastly, we have an excellent memoir by Dr. Burmeister on the Fossil Horses of the Pampas formation written in Spanish and German, and prepared, as it appears, on the occasion of the International Exhibition of Philadelphia. Eight well-executed lithographic plates illustrate this important work, which is executed in the same style as other excellent essays of the indefatigable author that we have already noticed on former occasions. An Appendix contains a complete list of the mammals of the Quaternary Pampian formation, remains of which are contained in the Public Museum of Buenos Ayres. From this it appears that between fifty and sixty species are represented more or less perfectly in this unparalleled series, amongst which are many specimens that, in spite of the richness of our own palæontological collections, might well excite the envy of Prof. Owen and Mr. Waterhouse.

OUR BOOK SHELF

United States Commission of Fish and Fisheries. Part III.—Report of the Commission for 1873–74 *and* 1874–75. (Washington Government Printing-office, 1876.)

THIS volume is quite as interesting as any of those which have preceded it, whilst the amount of reliable information it brings to a focus, not only regarding the fish and fisheries of the United States, but of the fisheries of Great Britain, Sweden, Prussia, Holland, France, and Russia, is remarkable; nor are the historical observations on the condition of the fisheries among the ancient Greeks and Romans, and on their modes of salting and pickling fish less interesting. The volume is throughout so rich in statistics and details of piscicultural labour that we feel embarrassed as to what part of it to notice first; to give a detailed account of the contents is simply impossible in anything like the space we can afford. As readers of NATURE may be aware, the present volume is one of a series having for its object an exposition of the present state of the American fisheries, and in particulur showing the extent to which the seas and waters of the United States have been over-fished, and how far the systems of artificial fish culture at present in vogue provide a remedy for the reckless spoliation of the waters which has been going on for the last twenty years. Familiar as we are with the figures of fish-culture, so far as they are locally applicable to British enterprise, and whether in respect of oysters or salmon, any details we can give are utterly dwarfed by the fabulous-looking figures applicable to what has been achieved in America. The young salmon which have been thrown into the River Tay from the Stormontfield hatching-ponds since the beginning of the experiments in 1853 up to the present time, will not be equal to the operations of one season on the Upper Sacramento; in 1875 the salmon eggs collected numbered 11,000,000, making a bulk of eighty bushels, and weighing nearly ten tons! These eggs, so carefully packed that only a small percentage was wasted, have been largely distributed over America, and will doubtless ultimately add largely to the fish supply of the United States.

Another fish which has been subjected to the manipulations of the pisciculturists on a positively gigantic scale is the shad, *Alosa sapidissima*, and the fish locally known as the "alewife," *Pomolobus pseudo-harengus*. These fishes were at one time (forty years since) exceedingly abundant in the Potomac river, so much so that as many as 22,500,000 shad and 750,000,000 alewife were captured in six weeks' time. Only a small percentage of

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[1] NATURE, vol. iii. p. 282; vol. vii. p. 240; and vol. xii. p. 145.

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these numbers can now be taken. Enormous quantities of shad have been bred from the egg and sent into the waters in order to renew the supply; many millions of healthy young fish are thus annually added to the stock, and fresh rivers are now being populated with shad.

Another fish to which the commission has of late directed its attention is the carp, *Cyprinus carpio*, and var. It is a fish which is thought to be eminently calculated for the warmer waters of America, and especially suited to the mill-ponds and sluggish rivers and ditches of the south. Some most interesting information is given about the carp and its numerous varieties, but it is too detailed for quotation. Another noteworthy feature of American fish-culture is the transport, in "an aquarium car," to the coast and inland waters of California, of various fishes and crustaceans of North America, in order to test the question of whether they could be acclimatised in the warmer latitudes of the Pacific. The first experiment failed through an accident on the railway, but on June 12, 1874, the car arrived safely with its interesting freight. Out of a lot of 150 lobsters which were placed in the aquarium car, only four, however, were left alive on reaching San Francisco Bay, and these were put into the sea at Oakland Wharf, nine days after they had been taken from the Atlantic Ocean. It is thought probable that the four specimens did not ultimately live, but as two of the four were big with spawn it is probable the eggs would come to maturity, as the death of the parent does not kill the spawn. Lobster eggs, unlike fish ova, are fructified before they leave the body of the animal.

An interesting account is given in the present volume of the American oyster fisheries.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Indian Rainfall and Sun-spots

SINCE my last communication to you on the above subject I have had some correspondence with Mr. Hill, the meteorological reporter to the North-West Provinces, in the course of which he has given me a more definite account of the results of his investigations. The outcome of our joint researches may be broadly stated as follows:—In years of maximum sun-spot the summer rainfall is *above* and the winter rainfall *below* the average, while in years of minimum sun-spot the reverse conditions hold, viz., the summer rainfall is *below* and the winter rainfall *above* the average.

Though the preceding hypothesis can only be considered at present in the light of a probability, it is considerably strengthened by the fact that, unknown to each other, Mr. Hill and myself have each taken it as the basis of our separate, and until recently, independent lines of inquiry. Mr. Hill has already sent in a short report to Government of the results of his own investigations, which he roughly states in the following words:—"I have examined the rainfall of Benares, Allahabad, Agra, Bareilly, Rourkee, Dehra, Mussoorie, and Naini Tal, since 1861, and I find that on the average the *total* annual rainfall of the maximum sun-spot years 1861, 1869, 1870, and 1871, is about 14 per cent. above the average for the whole period, and that of the minimum group 1866, 1867, and 1868, about 4 per cent. below it. On the other hand, when only the *winter* rainfall is considered, the defect in maximum sun-spot years is about 21 per cent. of the average winter fall, and the excess in minimum sun-spot years is above 20 per cent." Unfortunately no further data appear to be available in the North-West Provinces, as during the mutiny decade, 1851–1860, no register was kept, and before the mutiny the Schlagintweits took away to Germany most of the old rainfall records. The results, however, as far as they go, are in complete accordance with those I have obtained from a similar comparison of some of the rainfalls in Bengal.

The chief obstacles in the way of making a thoroughly complete and exhaustive comparison of the rainfalls throughout Northern India are (1) the paucity of registers, and (2) the limited periods over which they extend. In the single case of Calcutta the latter objection does not apply, since by dint of some trouble I have succeeded in obtaining the monthly as well as the annual falls for a period of forty years, from 1833 to 1876 inclusive. As this comprises four complete sun-spot cycles, the results are extremely valuable, especially as they tend to exhibit what Prof. Balfour Stewart considers to be the true test of a physical cycle, viz., its repetition.

I here append a comparison of the rainfall of Calcutta, for the months of January, February, and March, arranged in four groups of minimum and maximum sun-spot years, together with the years immediately preceding and following them (except in the case of the former, where the rise after the minimum is often very rapid).

Minimum sun-spot groups.		Maximum sun-spot groups.	
Years.	Total of each group.	Years.	Total of each group.
	inches.		inches.
1842 1843 1844	7·80	1836 1837 1838	3·54
1854 1855 1856	7·29	1847 1848 1849	6·68
1865 1866 1867	12·89	1859 1860 1861	6·42
1875 1876 1877	14·60	1869 1870 1871	9·76
Total of all the groups.	42·58	Total of all the groups.	26·40

In addition to this it may be noted that the total fall during the same three months of the four absolute minimum sun-spot years 1843, 1856, 1867, and 1877 (probable minimum) is 15·98 inches, while that of the four absolute maximum sun-spot years, 1837, 1848, 1860, and 1870, reaches only the insignificant amount of 2·48 inches. Similar results are obtained if the month of April and the months of November and December of the preceding years are respectively included, thus evidently showing that the relation is one connected with the seasonal distribution of the rainfall and not merely a coincidence, resulting from having taken the rainfalls of special months.

If we treat the rainfall of Dehra, from 1861 to 1877, in a somewhat similar manner, by taking the rainfalls of January, February, and the previous December, and consider 1861, 1862, and 1863 to approximately represent a maximum group, the results are as follows:—

Minimum sun-spot groups.		Maximum sun-spot groups.	
Years.	Total of each group.	Years.	Total of each group.
	inches.		inches.
1865 1866 1867	22·1	1861 1862 1863	2·6
1875 1876 1877	13·3	1869 1870 1871	10·5

I think an examination of the preceding comparisons of the winter rainfalls of Dehra and Calcutta (rough though they undoubtedly are) discloses distinct evidence of repetition in

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